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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
Akinobu KAKIMOTO, et al.	: EXAMINER: STOUFFER, KELLY M.
SERIAL NO: 10/511,440	:
FILED: OCTOBER 25, 2004	: GROUP ART UNIT: 1792
FOR: PROCESSING DEVICE USING SHOWER HEAD STRUCTURE AND PROCESSING METHOD	:

APPEAL BRIEF WITH APPENDICES

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from a final Office Action Mailed August 20, 2007. A Notice of Appeal was timely filed on December 20, 2007.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Tokyo Electron Limited having an address at 3-6, Akasaka 5-chome, Minato-Ku, Tokyo 107-8481, Japan. Tokyo Electron Limited is the real party in interest by way of assignment recorded in the U.S. Patent and Trademark Office at reel 016108, frame 0964.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignees are aware of no appeals or interferences which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 7-19 are pending. Claims 7-19 stand rejected, and the rejection of Claims 7-19 is herein appealed.

IV. STATUS OF THE AMENDMENTS

In a Final Office Action mailed August 20, 2007 (hereinafter "Final Action"), the Examiner finally rejected Claims 7-19. No amendments to the claims have been submitted after the mailing of the Final Action. The attached Appendix VII reflects Claims 7-19 as presently pending on appeal.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER[1]

The claimed invention, as recited in independent Claim 7, is directed to a processing method. Examples of the claimed processing method are shown in Figures 1-9, for example. The processing method is for processing an object (W) to be processed by using a processing

[1] It is Appellants' understanding that, under the rules of Practice before the Board of Patent Appeals and Interference, 37 C.F.R. § 41.37(c) requires that a concise explanation of the subject matter recited in each independent claim be provided with reference to the specification by page and line numbers and to the drawings by reference characters. However, Appellants' compliance with such requirements anywhere in this document should in no way be interpreted as limiting the scope of the invention recited in all pending claims, but simply as non-limiting examples thereof.

apparatus (2) including a processing chamber (4).[2] A shower head structure (6) is installed at a ceiling portion of the processing chamber (4) and includes a plurality of gas jetting holes (10) formed on a gas jetting surface (8) thereof to inject a processing gas into the processing chamber (4).[3] The gas jetting surface (8) faces toward an inside of the processing chamber. A mounting table (32) is installed in the processing chamber (4) to face toward the shower head structure (6).[4] The method includes the steps of loading the object to be processed on the mounting table and introducing the processing gas through the gas jetting holes into the processing chamber.[5] While processing the object, a head distance between the gas jetting surface and the mounting table and a gas jetting velocity from the gas jetting holes are restricted to be within an area in a plane coordinates system having the head distance as a horizontal axis and the gas jetting velocity as a vertical axis, the area being surrounded by a quadrilateral shape formed by straight lines connecting four points including a point where the gas jetting velocity is 32 m/sec and the head distance is 15 mm; a point where the gas jetting velocity is 67 m/sec and the head distance is 15 mm; a point where the gas jetting velocity is 40 m/sec and the head distance is 77 mm; and a point where the gas jetting velocity is 113 m/sec and the head distance is 77 mm.[6]

Claim 8 depends from Claim 7 and recites further features of the method. The processing gas contains ozone for reforming a metal oxide film formed on a surface of the object to be processed.[7]

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[2] See Appellants' specification as originally filed at page 8, lines 16-26, for example.
[3] See Appellants' specification as originally filed at page 9, lines 1-24, for example.
[4] See Appellants' specification as originally filed at page 10, lines 15-16, for example.
[5] See Appellants' specification as originally filed at page 14, lines 12-25, for example.
[6] See Appellants' specification as originally filed at page 15, lines 11-19, for example.
[7] See Appellants' specification as originally filed at page 14, line 22 to page 15, line 10, for example.

Claim 9 depends from Claim 8 and recites further features of the method. The metal oxide film is a tantalum oxide film.[8]

Claim 10 depends from Claim 7 and recites further features of the method. While processing the object, a pressure inside the processing chamber is maintained at a constant level.[9]

Claim 11 depends from Claim 7 and recites further features of the method. While processing the object, a temperature of the object to be processed is maintained at a constant level.[10]

The claimed invention, as recited in independent Claim 12, is directed to a processing method fro processing an object. Examples of the claimed processing method are shown in Figures 1-9, for example. The method includes loading the object onto a mounting table provided within a processing chamber having a plurality of gas jetting holes formed on a gas jetting surface facing towards the mounting table, and injecting a processing gas into the processing chamber through the plurality of gas jetting holes.[11] While the injecting takes place, the method includes restricting a distance between the gas jetting surface and the mounting table and a velocity of the processing gas from the plurality of gas jetting holes to be within an area in a plane coordinates system having the distance as a first axis thereof and the velocity as a second axis that is perpendicular to the first axis, in which the area has a quadrilateral shape formed by a first line connecting a first point where the velocity is 32 m/sec and the distance is 15 mm and a second point where the velocity is 67 m/sec and the distance is 15 mm, a second line connecting the first point to a third point where the velocity

[8] See Appellants' specification as originally filed at page 14, line 22 to page 15, line 10, for example.
[9] See Appellants' specification as originally filed at page 15, lines 3-6, for example.
[10] See Appellants' specification as originally filed at page 15, lines 6-10, for example.
[11] See Appellants' specification as originally filed at page 14, lines 12-25, for example.

is 40 m/sec and the distance is 77 mm, a third line connecting the second point to a fourth point where the velocity is 113 m/sec and the distance is 77 mm, and a fourth line connecting the third point to the fourth point.[12]

Claim 13 depends from Claim 12 and recites further features of the method. The processing gas being injected into the processing chamber contains ozone for reforming a metal oxide film formed on a surface of the object.[13]

Claim 14 depends from Claim 13 and recites further features of the method. The metal oxide film is a tantalum oxide film.[14]

Claim 15 depends from Claim 12 and recites further features of the method. Claim 15 recites maintaining a pressure within the processing chamber at a constant level while the processing gas is being injected into the processing chamber.[15]

Claim 16 depends from Claim 12 and recites further features of the method. Claim 16 maintaining a temperature within the processing chamber at a constant level while the processing gas is being injected into the processing chamber.[16]

VI. GROUNDS FOR REJECTION TO BE REVIEWED ON APPEAL

Whether Claims 7-19 are unpatentable under 35 U.S.C. § 103(a), as obvious over U.S. Patent Application Publication No. 2002/0034857 to Park (hereinafter "Park").

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[12] See Appellants' specification as originally filed at page 15, lines 11-19, for example.
[13] See Appellants' specification as originally filed at page 14, line 22 to page 15, line 10, for example.
[14] See Appellants' specification as originally filed at page 14, line 22 to page 15, line 10, for example.
[15] See Appellants' specification as originally filed at page 15, lines 3-6, for example.
[16] See Appellants' specification as originally filed at page 16, lines 15-17, for example.

VIII. ARGUMENT

A. THE REJECTION OF CLAIMS 7-19 UNDER 35 U.S.C. § 103(A) AS UNPATENTABLE OVER PARK.

1. Claim 7

a. The Final Action fails to make a *prima facie* case of obviousness.

Claim 7 recites a processing method that includes defined ranges of a head distance between a gas jetting surface of a shower head structure and a mounting table in a processing chamber and a gas jetting velocity from gas jetting holes formed on the gas jetting surface. Specifically, Claim 7 recites that while processing an object, a head distance between the gas jetting surface and the mounting table and the gas jetting velocity from the gas jetting holes are restricted to be within an area in a plane coordinates system having the head distance as a horizontal axis and the gas jetting velocity as a vertical axis, the area being surrounded by a quadrilateral shape formed by straight lines connecting four point including:

a point where the gas jetting velocity is 32 m/sec and the head distance is 15 mm;

a point where the gas jetting velocity is 67 m/sec and the head distance is 15 mm;

a point where the gas jetting velocity is 40 m/sec and the head distance is 77 mm; and

a point where the gas jetting velocity is 113 m/sec and the head distance is 77 mm.

Park fails to disclose or even suggest the claimed ranges of head distance between the gas jetting surface and the mounting table and gas jetting velocity.

In rejecting claims under 35 U.S.C. Section 103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed.Cir. 1992). Only if that burden is met, does the burden of coming forward with evidence or argument shift to the applicant. *Id.* "A *prima facie* case of

obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781, 782, 26 USPQ2d 1529, 1531 (Fed.Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)). If the examiner fails to establish a *prima facie* case, the rejection is improper and should be overturned. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed.Cir. 1988).

In the present case, the Final Action acknowledges that "Park et al. does not include using the claimed gas velocities or showerhead distances with the claimed relationship."[17] Indeed, Park makes no mention, whatsoever, of gas jetting velocities or of the head distance between the gas jetting surface and the mounting table. Nevertheless, the Final Action asserts that:

> Park et al. does include that showerhead distance (one would recognize that when looking at the apparatus labeled in Figure 1, by changing the height relative to the heater Park et al. is also changing the height relative to the showerhead and hence the area as described in the claims) and chamber pressures (which would include gas velocities that are directly related to chamber pressures) affect substrate temperatures (Figure 3, paragraphs 0041 and 0047) that determine the crystallinity of the final tantalum oxide film and leakage current of the film after annealing with ozone (paragraphs 0004-0008). The variables of distance between the substrate and showerhead, and gas velocities, are therefore result effective and are not inventive.[18]

The Final Action improperly characterizes the distance between the substrate and the showerhead and gas velocities as results effective variables. As noted in *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977), "a particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the

[17] See the Final Action at page 5, lines 11-12.
[18] See the Final Action at page 5, lines 12-22.

determination of the optimum or workable ranges of said variable might be characterized as routine experimentation."

By relying on the pressure described in Park as teaching the optimization of the gas jetting velocity and by relying on the distance between a heater and the substrate as a teaching of the optimization of the head distance between the gas jetting surface and the mounting table, the Final Action effectively asserts that optimizing the pressure in the chamber and the distance between the substrate and the heater *inherently* optimizes the gas jetting velocity and the head distance between the gas jetting surface and the mounting table. As such, the inherency assertion of the Final Action is incorrect and unsupported. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is ***necessarily*** present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may ***not*** be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (emphasis added) (citation omitted) (quoting *Continental Can Co. USA, Inc. v. Monsanto Co.*, 948 F.2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991)). "That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown." *In re Spormann*, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966). Such a retrospective view of inherency is not a substitute for some teaching or suggestion supporting an obviousness rejection. *See In re Newell*, 891 F.2d 899, 901, 13 USPQ2d 1248, 1250 (Fed. Cir. 1989).

Paragraph [0041] of Park describes that the temperature of a wafer can be changed by increasing or decreasing the pressure in a chamber 12. Regardless of whether Park describes that *pressure* can be optimized within the chamber 12, the *gas jetting velocity* is determined by

many different parameters, such as gas flow rate at an inlet port and number and size of gas jetting holes. For example, the gas jetting velocity can be varied even when the gas flow rate at the inlet port, and therefore the pressure inside the chamber, remains constant. Furthermore, even when the gas jetting velocity is determined only by the gas flow rate at the inlet port, adjusting a gas flow rate at an outlet port together with that at the inlet port would cause the pressure inside the processing chamber to be maintained constant, while the gas jetting velocity is varied. Thus, adjusting the pressure in a chamber 12 as described in Park does not *necessarily* result in a change in gas jetting velocity. Accordingly, Park does not inherently teach that the gas jetting velocity is a result-effective variable.

With respect to the claimed head distance between the gas jetting surface and the mounting table, Park is silent as to this dimensional relationship or any optimization thereof. Figure 1 of Park illustrates a process chamber 12 that includes a shower head 21 and a stage 31 on which a wafer W is mounted.[19] Park further describes that a heater 14 is located under the stage 31.[20] Paragraphs [0035] to [0040] of Park describe that the temperature of the wafer W can be changed based on the separation *between the wafer W and the heater 14* located under the stage 31. Park provides no teaching whatsoever relating to optimizing the distance between the stage 31 and the showerhead 21. Indeed, Park describes optimizing the separation between the wafer and the heater 14 *completely independent of* any discussion of the distance between the stage 31 and the showerhead 21. In particular, Park does not describe that moving the stage 31 *closer to the showerhead 21* changes the temperature of the wafer, but instead describes that moving the wafer *away from the heater 14* changes the temperature of the wafer. Therefore,

[19] See Park, at paragraph [0030].
[20] See Park, at paragraph [0030].

although Park recognizes the separation between the wafer and the heater 14 as a variable that achieves a recognized result, Park does not recognize that the distance between the stage 31 and the showerhead 21 achieves a recognized result.

Accordingly, Park fails to recognize either the claimed head distance between the gas jetting surface and the mounting table or the claimed gas jetting velocity from the gas jetting holes as results effective variables. Therefore, Park fails to disclose or suggest all of the features of Claim 7, and the Final Action has failed to make a *prima facie* case of obviousness. It is respectfully requested that the rejection of Claim 7 be reversed.

b. Appellants' specification provides data showing unexpected results.

Even assuming *arguendo* that the Final Action makes a *prima facie* case of obviousness, the specification of the present application provides evidence of the criticality of the claimed ranges. For example, as noted at page 15, lines 20-25 of Appellants' specification, by restricting the relationship between the head distance and gas jetting velocity to within the shaded area depicted in Figure 3, a wafer can be processed in a highly uniform manner, with improved processing efficiency, and improved throughput. In particular, page 16 line 1 to page 25, line 6 of Appellants' specification describes how the claimed range was determined with reference to Figures 4-9.

Therefore, the head distance and gas jetting velocity relationship defined in Claim 7 is critical in achieving advantageous results using variables and a relationship that the Park did not recognize or suggest.

Accordingly, as Appellants' specification includes experimentation that shows unexpected results, the claimed range is not obvious. It is respectfully requested that the rejection of Claim 7 be reversed.

2. Claim 8

Claim 8 depends from independent Claim 7 and recites further features that are not disclosed or suggested by Park. Claim 8 recites that the processing gas contains ozone for reforming a metal oxide film formed on a surface of the object to be processed.

As discussed above with respect to independent Claim 7, Park fails to disclose or suggest the claimed ranges of head distance between the gas jetting surface and the mounting table and gas jetting velocity, and Appellants' specification and Figures 4-9 of the present application demonstrate criticality of the claimed ranges. Nevertheless, the Final Action asserts that "[a]s for the specification and Figures 4-9 containing evidence of criticality of the claimed values, the examiner notes that evidence of criticality can only be shown when the evidence is commensurate in scope with the claims. The specification and drawings provide support for criticality of these values for only particular precursors, etc. and not all gaseous precursors and claimed in the independent claims."

Dependent Claim 8 limits the process gas to a processing gas that contains ozone for reforming a metal oxide film formed on a surface of the object to be processed. Therefore, assuming *arguendo* that Claim 7 is determined to not be commensurate with the scope of the demonstrated criticality, Claim 8 is believed to be commensurate with the scope of the criticality demonstrated in Appellants' disclosure as originally filed.

Accordingly, Park fails to disclose or suggest the features of Claim 8. It is respectfully requested that the rejection of Claim 8 be reversed.

3. Claim 9

Claim 9 depends from dependent Claim 8 and recites further features that are not disclosed or suggested by Park. Claim 9 recites that the claimed metal oxide film is a tantalum oxide film.

As discussed above with respect to independent Claim 7, Park fails to disclose or suggest the claimed ranges of head distance between the gas jetting surface and the mounting table and gas jetting velocity, and Appellants' specification and Figures 4-9 of the present application demonstrate criticality of the claimed ranges. Nevertheless, the Final Action asserts that "[a]s for the specification and Figures 4-9 containing evidence of criticality of the claimed values, the examiner notes that evidence of criticality can only be shown when the evidence is commensurate in scope with the claims. The specification and drawings provide support for criticality of these values for only particular precursors, etc. and not all gaseous precursors and claimed in the independent claims."

Dependent Claim 9 in combination with dependent Claim 8 limits the process gas to a processing gas that contains ozone for reforming a metal oxide film formed on a surface of the object to be processed, and limits the metal oxide film to a tantalum oxide film. Therefore, assuming *arguendo* that Claim 7 is determined to not be commensurate with the scope of the demonstrated criticality, Claim 8 in combination with Claim 9 is believed to be commensurate with the scope of the criticality demonstrated in Appellants' disclosure as originally filed.

Accordingly, Park fails to disclose or suggest the features of Claim 9. It is respectfully requested that the rejection of Claim 9 be reversed.

4. Claim 10

Claim 10 depends from Claim 7 and recites further features that are not disclosed or suggested by Park. Claim 10 recites that while processing the object, a pressure inside the processing chamber is maintained at a constant level. As discussed above with respect to independent Claim 7, the Final Action effectively asserts that because Park describes that a change in pressure can be used to control temperature, Park inherently describes optimizing gas jetting velocity. Even assuming *arguendo* that it is proper to make such an assertion, Claim 10 recites that the pressure inside the processing chamber is maintained *at a constant level*. Therefore, even the multiple pressures of Park fail to disclose or suggest the claimed range of gas jetting velocities, which Claim 10 recites occur at *a constant* pressure level.

Accordingly, Park fails to disclose or suggest the features of Claim 10. It is respectfully requested that the rejection of Claim 10 be reversed.

5. Claim 11

Claim 11 depends from Claim 7 and recites further features that are not disclosed or suggested by Park. Claim 11 recites that while processing the object, a temperature of the object to be processed is maintained at a constant level. As discussed above with respect to independent Claim 7, the Final Action effectively asserts that because Park describes that changing a distance between the wafer W and the heater 14 can optimize the temperature of the wafer W, Park inherently describes optimizing the claimed head distance between the claimed gas jetting surface and the claimed mounting table. Even assuming *arguendo* that it is proper to make such an assertion, Claim 11 recites that the temperature of the object to be

processed is maintained *at a constant level*. Therefore, even the multiple positions of the wafer W in Park fail to disclose or suggest the claimed range of head distance between the claimed gas jetting surface and the claimed mounting table, which Claim 11 recites occur when the object to be processed has a *constant* temperature level.

Accordingly, Park fails to disclose or suggest the features of Claim 11. It is respectfully requested that the rejection of Claim 11 be reversed.

6. Claim 12

Claim 12 recites a processing method for processing an object. The method includes loading the object onto a mounting table provided within a processing chamber having a plurality of gas jetting holes formed on a gas jetting surface facing towards the mounting table. Claim 12 recites that the method further includes injecting a processing gas into the processing chamber through the plurality of gas jetting holes while restricting a distance between the gas jetting surface and the mounting table and a velocity of the processing gas from the plurality of gas jetting holes to be within an area in a plane coordinates system having the distance as a first axis thereof and the velocity as a second axis that is perpendicular to the first axis. Claim 12 restricts the claimed area to a quadrilateral shape formed by:

> a first line connecting a first point where the velocity is 32 m/sec and the distance is 15 mm and a second point where the velocity is 67 m/sec and the distance is 15 mm,
>
> a second line connecting the first point to a third point where the velocity is 40 m/sec and the distance is 77 mm,

a third line connecting the second point to a fourth point where the velocity is 113 m/sec and the distance is 77 mm, and

a fourth line connecting the third point to the fourth point.

As discussed above with respect to independent Claim 7, Park fails to disclose or suggest the claimed ranges of velocities from a plurality of gas jetting holes, or the claimed distance between the claimed gas jetting surface and the claimed mounting table. Even though the Final Action acknowledges this deficiency in Park, the Final Action effectively asserts that (1) because Park describes that a change in pressure can be used to control temperature, Park inherently describes optimizing gas jetting velocity, and that (2) because Park describes that changing a distance between the wafer W and the heater 14 can optimize the temperature of the wafer W, Park inherently describes optimizing the claimed distance between the claimed gas jetting surface and the claimed mounting table. However, for the reasons set forth in detail above, the Final Action fails to make a *prima facie* case of obviousness. Moreover, even if it is determined that the Final Action makes a *prima facie* case of obviousness, Appellants' specification includes experimentation that demonstrates the unexpected results achieved in the claimed ranges.

Accordingly, Park fails to disclose or suggest all of the features of Claim 12. It is respectfully requested that the rejection of Claim 12 be reversed.

7. Claim 13

Claim 13 depends from independent Claim 12 and recites further features that are not disclosed or suggested by Park. Claim 13 recites that the processing gas being injected into the processing chamber contains ozone for reforming a metal oxide film formed on a surface of the object.

As discussed above with respect to independent Claim 12, Park fails to disclose or suggest the claimed ranges of head distance between the gas jetting surface and the mounting table and gas jetting velocity, and Appellants' specification and Figures 4-9 of the present application demonstrate criticality of the claimed ranges. Nevertheless, the Final Action asserts that "[a]s for the specification and Figures 4-9 containing evidence of criticality of the claimed values, the examiner notes that evidence of criticality can only be shown when the evidence is commensurate in scope with the claims. The specification and drawings provide support for criticality of these values for only particular precursors, etc. and not all gaseous precursors and claimed in the independent claims."

Dependent Claim 13 limits the processing gas being injected into the processing chamber to a processing gas that contains ozone for reforming a metal oxide film formed on a surface of the object. Therefore, assuming *arguendo* that Claim 12 is determined to not be commensurate with the scope of the demonstrated criticality, Claim 13 is believed to be commensurate with the scope of the criticality demonstrated in Appellants' disclosure as originally filed.

Accordingly, Park fails to disclose or suggest the features of Claim 13. It is respectfully requested that the rejection of Claim 13 be reversed.

8. Claim 14

Claim 14 depends from dependent Claim 13 and recites further features that are not disclosed or suggested by Park. Claim 14 recites that the claimed metal oxide film is a tantalum oxide film.

As discussed above with respect to independent Claim 12, Park fails to disclose or suggest the claimed ranges of head distance between the gas jetting surface and the mounting

table and gas jetting velocity, and Appellants' specification and Figures 4-9 of the present application demonstrate criticality of the claimed ranges. Nevertheless, the Final Action asserts that "[a]s for the specification and Figures 4-9 containing evidence of criticality of the claimed values, the examiner notes that evidence of criticality can only be shown when the evidence is commensurate in scope with the claims. The specification and drawings provide support for criticality of these values for only particular precursors, etc. and not all gaseous precursors and claimed in the independent claims."

Dependent Claim 14 in combination with dependent Claim 13 limits the processing gas being injected into the processing chamber to a process gas that contains ozone for reforming a metal oxide film formed on a surface of the object, and limits the metal oxide film to a tantalum oxide film. Therefore, assuming *arguendo* that Claim 12 is determined to not be commensurate with the scope of the demonstrated criticality, Claim 13 in combination with Claim 14 is believed to be commensurate with the scope of the criticality demonstrated in Appellants' disclosure as originally filed.

Accordingly, Park fails to disclose or suggest the features of Claim 14. It is respectfully requested that the rejection of Claim 14 be reversed.

9. Claim 15

Claim 15 depends from Claim 12 and recites further features that are not disclosed or suggested by Park. Claim 15 recites maintaining a pressure within the processing chamber at a constant level while the processing gas is being injected into the processing chamber. As discussed above with respect to independent Claim 12, the Final Action effectively asserts that because Park describes that a change in pressure can be used to control temperature, Park inherently describes optimizing gas jetting velocity. Even assuming *arguendo* that it is

proper to make such an assertion, Claim 15 recites maintaining a pressure within the processing chamber *at a constant level*. Therefore, even the multiple pressures of Park fail to disclose or suggest the claimed range of gas jetting velocities, which Claim 15 recites occur at *a constant* pressure level.

Accordingly, Park fails to disclose or suggest the features of Claim 15. It is respectfully requested that the rejection of Claim 15 be reversed.

10. Claim 16

Claim 16 depends from Claim 12 and recites further features that are not disclosed or suggested by Park. Claim 16 recites maintaining a temperature within the processing chamber at a constant level while the processing gas is being injected into the processing chamber. As discussed above with respect to independent Claim 12, the Final Action effectively asserts that because Park describes that a change in pressure can be used to control temperature, Park inherently describes optimizing gas jetting velocity. Even assuming *arguendo* that it is proper to make such an assertion, Claim 16 recites maintaining a temperature within the processing chamber *at a constant level* while the processing gas is being injected into the processing chamber. Therefore, even the multiple positions of the wafer W in Park fail to disclose or suggest the claimed range of head distance between the claimed gas jetting surface and the claimed mounting table, which Claim 16 recites occurs while maintaining a temperature within the processing chamber *at a constant level.*

Accordingly, Park fails to disclose or suggest the features of Claim 16. It is respectfully requested that the rejection of Claim 16 be reversed.

B. CONCLUSION

In view of the foregoing, it is respectfully submitted that the cited references, whether considered alone or in combination, fail to disclose or suggest the combined features set forth in Claims 7-19. Accordingly, it is respectfully requested that the rejections of Claims 7-19 be reversed.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

Claims 1-6 (Canceled).

Claim 7 (Rejected): A processing method for processing an object to be processed by using a processing apparatus including a processing chamber; a shower head structure, installed at a ceiling portion of the processing chamber, having a plurality of gas jetting holes formed on a gas jetting surface thereof to inject a processing gas into the processing chamber, the gas jetting surface facing toward an inside of the processing chamber; and a mounting table installed in the processing chamber to face toward the shower head structure, the method comprising the steps of:

loading the object to be processed on the mounting table; and

introducing the processing gas through the gas jetting holes into the processing chamber,

wherein while processing the object, a head distance between the gas jetting surface and the mounting table and a gas jetting velocity from the gas jetting holes are restricted to be within an area in a plane coordinates system having the head distance as a horizontal axis and the gas jetting velocity as a vertical axis, the area being surrounded by a quadrilateral shape formed by straight lines connecting four points including a point where the gas jetting velocity is 32 m/sec and the head distance is 15 mm; a point where the gas jetting velocity is 67 m/sec and the head distance is 15 mm; a point where the gas jetting velocity is 40 m/sec and the head distance is 77 mm; and a point where the gas jetting velocity is 113 m/sec and the head distance is 77 mm.

Claim 8 (Rejected): The method of claim 7, wherein the processing gas contains ozone for reforming a metal oxide film formed on a surface of the object to be processed.

Claim 9 (Rejected): The method of claim 8, wherein the metal oxide film is a tantalum oxide film.

Claim 10 (Rejected): The method of claim 7, wherein while processing the object, a pressure inside the processing chamber is maintained at a constant level.

Claim 11 (Rejected): The method of claim 7, wherein while processing the object, a temperature of the object to be processed is maintained at a constant level.

Claim 12 (Rejected): A processing method for processing an object, said method comprising:

loading the object onto a mounting table provided within a processing chamber having a plurality of gas jetting holes formed on a gas jetting surface facing towards the mounting table; and

injecting a processing gas into the processing chamber through the plurality of gas jetting holes while restricting a distance between the gas jetting surface and the mounting table and a velocity of the processing gas from the plurality of gas jetting holes to be within an area in a plane coordinates system having the distance as a first axis thereof and the velocity as a second axis that is perpendicular to the first axis,

wherein the area has a quadrilateral shape formed by a first line connecting a first point where the velocity is 32 m/sec and the distance is 15 mm and a second point where the velocity is 67 m/sec and the distance is 15 mm, a second line connecting the first point to a third point where the velocity is 40 m/sec and the distance is 77 mm, a third line connecting the second point to a fourth point where the velocity is 113 m/sec and the distance is 77 mm, and a fourth line connecting the third point to the fourth point.

Claim 13 (Rejected): The method of claim 12, wherein the processing gas being injected into the processing chamber contains ozone for reforming a metal oxide film formed on a surface of the object.

Claim 14 (Rejected): The method of claim 13, wherein the metal oxide film is a tantalum oxide film.

Claim 15 (Rejected): The method of claim 12, further comprising maintaining a pressure within the processing chamber at a constant level while the processing gas is being injected into the processing chamber.

Claim 16 (Rejected): The method of claim 12, further comprising maintaining a temperature within the processing chamber at a constant level while the processing gas is being injected into the processing chamber.

Claim 17 (Rejected): The method of claim 12, wherein the processing chamber in which the object is loaded is configured such that the plurality of gas jetting holes are all provided within a circular area on the gas jetting surface, and such that the mounting table has a circular shape.

Claim 18 (Rejected): The method of claim 17, wherein the circular area has a diameter that is equal to or smaller than a diameter of the object.

Claim 19 (Rejected): The method of claim 17, wherein the circular area has a diameter that is 70% to 100% of a diameter of the object.

IX. EVIDENCE APPENDIX

None.

X. RELATED PROCEEDINGS APPENDIX

None.